

0/506630

## SEQUENCE LISTING

<110> GOKHALE, Rajesh  
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KHOSLA, Chaitan  
WU, Nicholas  
CANE, David

<120> METHODS TO MEDIATE POLYKETIDE SYNTHASE  
MODULE EFFECTIVENESS

<130> 300622004601

<140> US 10/506,630

<141> 2002-03-04

<150> PCT/US03/06910

<151> 2002-03-04

<150> US 10/091,244

<151> 2002-03-04

<150> 60/361,758

<151> 2002-03-04

<160> 41

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<223> Nhe site upstream of the KS at position 7570

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15

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<223> Nhe site upstream of the KS at position 28710

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gctagcgacc cgatc

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<211> 31

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 20 25 30

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<400> 5  
 gggaattcag gtcctctccc ccgc 24

<210> 6  
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<220>  
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 ccatatggtg gtcgaccggc tcg 23

<210> 7  
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<400> 8  
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<210> 9  
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<220>  
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<400> 9  
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25

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<400> 10  
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<400> 13

gaattcttag ccgagctc cgtc

24

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27

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<400> 16  
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27

<210> 17  
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<220>  
<223> primer

<400> 17  
cccgtgagc ctacaggtcc tctcccc

27

<210> 18  
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<400> 18  
Gly Gly Ala Thr Gly Ala Glu Gln Ala Ala Pro Ala Thr Thr Ala Pro  
1 5 10 15

Val Asp

<210> 19  
<211> 18  
<212> PRT  
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<220>  
<223> Intra-polypeptide linker

<400> 19  
Val Gly Asp Ala Asp Gln Ala Ala Val Arg Val Val Gly Ala Ala Asp  
1 5 10 15  
Glu Ser

<210> 20  
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<212> PRT  
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<220>  
<223> Intra-polypeptide linker

<400> 20  
Val Gly Ala Ala Glu Ala Glu Gln Ala Pro Ala Leu Val Arg Glu Val  
1 5 10 15  
Pro Lys Asp Ala Asp  
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<210> 21  
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<212> PRT  
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<223> Intra-polypeptide linker

<400> 21  
Phe Gly Ser Ala Ala Asn Arg Pro Ala Glu Ile Gly Thr Ala Ala Ala  
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Glu

<210> 22  
<211> 17  
<212> PRT  
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<220>  
<223> Intra-polypeptide linker

<400> 22  
Leu Gly Glu Arg Pro Ala Ala Pro Ala Pro Val Thr Arg Asp Val Ser  
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<210> 23  
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<220>  
<223> Intra-polypeptide linker

<400> 23  
Gly Glu Thr Val Ala Gly Ala Pro Ala Thr Pro Val Thr Thr Val Ala  
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Asp Ala Gly

<210> 24  
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<220>  
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<400> 24  
Glu Leu Phe Thr Gly Glu Asn Pro Ala Pro Val Arg Gly Pro Val Ser  
1 5 10 15  
Ala Val Gly Gln Asp  
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<210> 25  
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<212> PRT  
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<220>  
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<400> 25  
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Val Val Gly Gln Asp  
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<210> 26  
<211> 20  
<212> PRT  
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<220>  
<223> Intra-polypeptide linker

<400> 26  
Glu Leu Phe Thr Gly Glu Asn Pro Ala Pro Val Arg Gly Pro Val Ser  
1 5 10 15  
Ala Gly Gln Asp  
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<210> 27

<211> 30  
<212> PRT  
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<220>  
<223> N-Terminal Inter-polypeptide linker

<400> 27  
Val Thr Asp Ser Glu Lys Val Ala Glu Tyr Leu Arg Arg Ala Thr Leu  
1 5 10 15  
Asp Leu Arg Ala Ala Arg Gln Arg Ile Arg Glu Leu Glu Ser  
20 25 30

<210> 28  
<211> 38  
<212> PRT  
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<400> 28  
Met Ser Gly Asp Asn Gly Met Thr Glu Glu Lys Leu Arg Arg Tyr Leu  
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Lys Arg Thr Val Thr Glu Leu Asp Ser Val Thr Ala Arg Leu Arg Glu  
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Val Glu His Arg Ala Gly  
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<210> 29  
<211> 34  
<212> PRT  
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<220>  
<223> N-Terminal Inter-polypeptide linker

<400> 29  
Met Ser Ala Pro Asn Glu Gln Ile Val Asp Ala Leu Arg Ala Ser Leu  
1 5 10 15  
Lys Glu Asn Val Arg Leu Gln Gln Glu Asn Ser Ala Leu Ala Ala  
20 25 30  
Ala Ala

<210> 30  
<211> 34  
<212> PRT  
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<220>  
<223> N-Terminal Inter-polypeptide linker

<400> 30  
Val Ser Ala Ser Tyr Glu Lys Val Val Glu Ala Leu Arg Lys Ser Leu  
1 5 10 15  
Glu Glu Val Gly Thr Leu Lys Lys Arg Asn Arg Gln Leu Ala Asp Ala  
20 25 30  
Ala Gly

<210> 31  
<211> 33  
<212> PRT  
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<220>  
<223> N-Terminal Inter-polypeptide linker

<400> 31  
Val Ala Asp Glu Gly Gln Leu Arg Asp Tyr Leu Lys Arg Ala Ile Ala  
1 5 10 15  
Asp Ala Arg Asp Ala Arg Thr Arg Leu Arg Glu Val Glu Glu Gln Ala  
20 25 30  
Arg

<210> 32  
<211> 30  
<212> PRT  
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<220>  
<223> N-Terminal Inter-polypeptide linker

<400> 32  
Met Ala Thr Asp Glu Lys Leu Leu Lys Tyr Leu Lys Arg Val Thr Ala  
1 5 10 15  
Glu Leu His Ser Leu Arg Lys Gln Gly Ala Arg His Ala Asp  
20 25 30

<210> 33  
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<220>  
<223> N-Terminal Inter-polypeptide linker

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Met Arg Glu Asp Gln Leu Leu Asp Ala Leu Arg Lys Ser Val Lys Glu  
1 5 10 15  
Asn Ala Arg Leu Arg Lys Ala Asn Thr Ser Leu Arg Ala Ala Met Asp  
20 25 30

<210> 34  
<211> 33  
<212> PRT  
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<220>  
<223> N-Terminal Inter-polypeptide linker

<400> 34  
Met Pro Glu Gln Asp Lys Val Val Glu Tyr Leu Arg Trp Ala Thr Ala  
1 5 10 15  
Glu Leu His Thr Thr Arg Ala Lys Leu Glu Ala Leu Ala Ala Ala Asn



Thr

20

25

30

<210> 35  
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<212> PRT  
<213> Artificial Sequence

<220>  
<223> Alignment of the EryA SU

<400> 35  
Val Val Phe Val Phe Pro Gly Gln Gly Ala Gln Trp Ala Gly Met Ala  
1 5 10 15  
Gly Glu Leu Ile Gly Glu Ser Arg Val Phe Ala Ala Met Asp Ala  
20 25 30  
Cys Ala Arg Ala Phe Glu Pro Val Thr Asp Trp Thr Leu Ala Gln Val  
35 40 45  
Leu Asp Ser Pro Glu Gln Ser Arg Arg Val Glu Val Val Gln Pro Ala  
50 55 60  
Leu Phe Ala Val Gln Thr Ser Leu Ala Ala Leu Trp Arg Ser Phe Gly  
65 70 75 80  
Val Thr Pro Asp Ala Val Val Gly His Ser Ile Gly Glu Leu Ala Ala  
85 90 95  
Ala His Val Cys Gly Ala Ala Gly Ala Ala Asp Ala Ala Arg Ala Ala  
100 105 110  
Ala Leu Trp Ser Arg Glu Met Ile Pro Ile Val Gly Asn Gly Asp Met  
115 120 125  
Met Ala Val Ala Leu Ser Ala Asp Glu Ile Glu Pro Arg Ile Ala Arg  
130 135 140  
Trp Asp Asp Val Val Leu Ala Gly Val Asn Gly Pro Arg Ser Val Leu  
145 150 155 160  
Leu Thr Gly Ser Pro Glu Pro Val Ala Arg Arg Val Gln Glu Leu Ser  
165 170 175  
Ala Glu Gly Val Arg Ala Gln Val Ile Asn Val Ser Met Ala Ala His  
180 185 190  
Ser Ala Gln Val Asp Asp Ile Ala Glu Gly Met Arg Ser Ala Leu Ala  
195 200 205  
Trp Phe Ala Pro Gly Gly Ser Glu Val Pro Phe Tyr Ala Ser Leu Thr  
210 215 220  
Gly Gly Ala Val Asp Thr Arg Glu Leu Val Ala Asp Tyr Trp Arg Arg  
225 230 235 240  
Ser Phe Arg Leu Pro Val Arg Phe Asp Glu Ala Ile Arg Ser Ala Leu  
245 250 255  
Glu Val Gly Pro Gly Thr Phe Val Glu Ala Ser Pro His Pro Val Ile  
260 265 270  
Ala Ala Ala Leu Gln Gln Thr Leu Asp Ala Glu Gly Ser Ser Ala Ala  
275 280 285  
Val Val Pro Thr Leu Gln Arg Gly Gln Gly Gly Met Arg Arg Phe Leu  
290 295 300  
Leu Ala Ala Ala Gln Ala Phe Thr Gly Gly Val Ala Val Asp Trp Thr  
305 310 315 320  
Ala Ala Tyr Asp Asp Val Gly Pro Asn Pro Ala Leu Gly Arg Glu Ala  
325 330 335  
Asp Ala Glu Ala Thr Phe Arg Glu Leu Gly Leu Asp Ser Val Leu Ala  
340 345 350  
Ala Gln Ile Arg Ala Lys Val Ser Ala Ala Ile Gly Arg Glu Val Asn  
355 360 365  
Ile Ala Leu Leu Tyr Asp His Pro Thr Pro Arg Ala Leu Ala Glu Ala  
370 375 380  
Leu Ala Ala Gly

<210> 36  
 <211> 1397  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Alignment of the EryA SU

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 Ala Ala Pro Gly Glu Pro Val Ala Val Val Ala Met Ala Cys Arg Leu  
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 20 25 30  
 Gly Arg Asp Ala Val Ala Gly Leu Pro Thr Asp Arg Gly Trp Asp Leu  
 35 40 45  
 Asp Ser Leu Phe His Pro Asp Pro Thr Arg Ser Gly Thr Ala His Gln  
 50 55 60  
 Arg Gly Gly Gly Phe Leu Thr Glu Ala Thr Ala Phe Asp Pro Ala Phe  
 65 70 75 80  
 Phe Gly Met Ser Pro Arg Glu Ala Leu Ala Val Asp Pro Gln Gln Arg  
 85 90 95  
 Leu Met Leu Glu Leu Ser Trp Glu Val Leu Glu Arg Ala Gly Ile Pro  
 100 105 110  
 Pro Thr Ser Ile Gln Ala Ser Pro Thr Gly Val Phe Val Gly Leu Ile  
 115 120 125  
 Pro Gln Glu Tyr Gly Pro Arg Leu Ala Glu Gly Gly Glu Gly Val Glu  
 130 135 140  
 Gly Tyr Leu Met Thr Gly Thr Thr Thr Ser Val Ala Ser Gly Arg Ile  
 145 150 155 160  
 Ala Tyr Thr Leu Gly Leu Glu Gly Pro Ala Ile Ser Val Asp Thr Ala  
 165 170 175  
 Cys Ser Ser Ser Leu Val Ala Val His Leu Ala Cys Gln Ser Leu Arg  
 180 185 190  
 Arg Gly Glu Ser Ser Ile Ala Met Ala Gly Gly Val Thr Val Met Pro  
 195 200 205  
 Thr Pro Gly Met Leu Val Asp Phe Ser Arg Met Asn Ser Leu Ala Pro  
 210 215 220  
 Asp Gly Arg Cys Lys Ala Phe Ser Ala Gly Ala Asn Gly Phe Gly Met  
 225 230 235 240  
 Ala Glu Gly Ala Gly Met Leu Leu Ile Glu Arg Leu Ser Asp Ala Arg  
 245 250 255  
 Arg Asn Gly His Pro Val Leu Ala Val Leu Arg Gly Thr Ala Val Asn  
 260 265 270  
 Ser Asp Gly Ala Ser Asn Gly Leu Ser Ala Pro Asn Gly Arg Ala Gln  
 275 280 285  
 Val Arg Val Ile Gln Gln Ala Leu Ala Glu Ser Gly Leu Gly Pro Ala  
 290 295 300  
 Asp Ile Asp Ala Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp  
 305 310 315 320  
 Pro Ile Glu Ala Arg Ala Leu Phe Glu Ala Tyr Gly Arg Asp Arg Glu  
 325 330 335  
 Gln Pro Leu His Leu Gly Ser Val Lys Ser Asn Leu Gly His Thr Gln  
 340 345 350  
 Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Leu Ala Met Arg  
 355 360 365  
 Ala Gly Thr Leu Pro Arg Thr Leu His Ala Ser Glu Arg Ser Lys Glu  
 370 375 380  
 Ile Asp Trp Ser Ser Gly Ala Ile Ser Leu Ile Asp Glu Pro Glu Pro  
 385 390 395 400

Trp	Pro	Ala	Gly	Ala	Arg	Pro	Arg	Arg	Ala	Gly	Val	Ser	Ser	Phe	Gly
				405					410					415	
Ile	Ser	Gly	Thr	Asn	Ala	His	Ala	Ile	Ile	Glu	Glu	Ala	Pro	Gln	Val
				420				425					430		
Val	Glu	Gly	Glu	Arg	Val	Glu	Ala	Gly	Asp	Val	Val	Ala	Pro	Trp	Val
		435					440					445			
Leu	Ser	Ala	Ser	Ser	Ala	Glu	Gly	Leu	Arg	Ala	Gln	Ala	Ala	Arg	Leu
	450					455					460				
Ala	Ala	His	Leu	Arg	Glu	His	Pro	Gly	Gln	Asp	Pro	Arg	Asp	Ile	Ala
465					470					475					480
Tyr	Ser	Leu	Ala	Thr	Gly	Arg	Ala	Ala	Leu	Pro	His	Arg	Ala	Ala	Phe
				485					490					495	
Ala	Pro	Val	Asp	Glu	Ser	Ala	Ala	Leu	Arg	Val	Leu	Asp	Gly	Leu	Ala
			500					505					510		
Thr	Gly	Asn	Ala	Asp	Gly	Ala	Ala	Val	Gly	Thr	Ser	Arg	Ala	Gln	Gln
		515					520					525			
Arg	Ala	Val	Phe	Val	Trp	Ala	Ala	Val	Asp	Asp	Thr	Ser	Pro	Ala	Ala
	530					535					540				
Leu	Arg	Glu	Ala	Asp	Ala	Leu	Glu	Pro	His	Leu	Asp	Arg	Glu	Val	Ile
545					550					555					560
Pro	Phe	Leu	Arg	Ala	Glu	Ala	Ala	Arg	Arg	Glu	Gln	Asp	Ala	Ala	Leu
				565				570						575	
Ser	Thr	Glu	Asp	Val	Val	Met	Ala	Val	Met	Val	Ser	Met	Arg	Ala	His
			580					585					590		
Val	Glu	Ala	Ile	Gln	Ile	Cys	Ala	Ala	Leu	Ser	Leu	Asp	Asp	Ala	Ala
	595						600					605			
Arg	Val	Val	Ala	Leu	Arg	Ser	Arg	Val	Ile	Ala	Thr	Met	Pro	Gly	Asn
	610					615					620				
Lys	Gly	Ala	Ser	Ile	Ala	Ala	Pro	Ala	Gly	Glu	Val	Arg	Ala	Arg	Ile
625					630					635					640
Gly	Asp	Arg	Val	Glu	Ile	Ala	Gly	Arg	Ser	Val	Val	Val	Ala	Asp	Ser
				645				650						655	
Asp	Glu	Leu	Asp	Arg	Leu	Val	Ala	Ser	Cys	Thr	Thr	Glu	Cys	Ile	Arg
		660						665					670		
Ala	Lys	Arg	Leu	Ala	Asp	Tyr	Ser	Ser	Ser	His	Val	Glu	Thr	Ile	Arg
	675						680					685			
Asp	Ala	Leu	His	Ala	Glu	Leu	Gly	Glu	Asp	Phe	His	Pro	Leu	Pro	Gly
	690					695				700					
Phe	Val	Pro	Phe	Phe	Thr	Val	Thr	Gly	Arg	Trp	Thr	Gln	Pro	Asp	Glu
705					710					715					720
Leu	Asp	Ala	Gly	Tyr	Arg	Asn	Ile	Arg	Thr	Arg	Ala	Asp	Val	Arg	Ala
				725				730						735	
Leu	Ala	Glu	Gln	Tyr	Arg	Thr	Leu	Val	Ala	Ile	Leu	Thr	Ala	Ala	Ile
		740						745					750		
Glu	Glu	Ile	Gly	Asp	Gly	Ser	Gly	Ala	Asp	Leu	Ser	Ala	Ile	His	Ser
		755					760					765			
Arg	Gly	Asp	Gly	Ser	Leu	Ala	Asp	Phe	Gly	Glu	Ala	Leu	Ser	Arg	Phe
	770					775					780				
Ala	Ala	Ala	Val	Asp	Trp	Glu	Ser	Val	His	Leu	Gly	Thr	Gly	Ala	Arg
785					790					795					800
Arg	Val	Pro	Leu	Pro	Thr	Tyr	Pro	Phe	Gln	Arg	Glu	Arg	Val	Trp	Leu
				805					810					815	
Glu	Pro	Lys	Pro	Val	Ala	Arg	Arg	Ser	Thr	Glu	Val	Asp	Glu	Val	Ser
			820					825					830		
Ala	Leu	Arg	Tyr	Arg	Ile	Glu	Trp	Arg	Pro	Thr	Gly	Ala	Gly	Glu	Pro
		835					840					845			
Ala	Arg	Leu	Asp	Gly	Thr	Trp	Leu	Val	Ala	Lys	Tyr	Ala	Gly	Thr	Ala
	850					855					860				
Asp	Glu	Thr	Ser	Thr	Ala	Ala	Arg	Glu	Ala	Leu	Glu	Ser	Ala	Gly	Ala
865					870					875					880
Arg	Val	Arg	Glu	Leu	Val	Val	Asp	Ala	Arg	Cys	Gly	Arg	Asp	Glu	Leu
				885					890						895

Ala Glu Arg Leu Arg Ser Val Gly Glu Val Ala Gly Val Leu Ser Leu  
 900 905 910  
 Leu Ala Val Asp Glu Ala Glu Pro Glu Glu Ala Pro Leu Ala Leu Ala  
 915 920 925  
 Ser Leu Ala Asp Thr Leu Ser Leu Val Gln Ala Met Val Ser Ala Glu  
 930 935 940  
 Leu Gly Cys Pro Leu Trp Thr Val Thr Glu Ser Ala Val Ala Thr Gly  
 945 950 955 960  
 Pro Phe Glu Arg Val Arg Asn Ala Ala His Gly Ala Leu Trp Gly Val  
 965 970 975  
 Gly Arg Val Ile Ala Leu Glu Asn Pro Ala Val Trp Gly Gly Leu Val  
 980 985 990  
 Asp Val Pro Ala Gly Ser Val Ala Glu Leu Ala Arg His Leu Ala Ala  
 995 1000 1005  
 Val Val Ser Gly Gly Ala Gly Glu Asp Gln Leu Ala Leu Arg Ala Asp  
 1010 1015 1020  
 Gly Val Tyr Gly Arg Arg Trp Val Arg Ala Ala Pro Ala Thr Asp  
 1025 1030 1035 1040  
 Asp Glu Trp Lys Pro Thr Gly Thr Val Leu Val Thr Gly Gly Thr Gly  
 1045 1050 1055  
 Gly Val Gly Gly Gln Ile Ala Arg Trp Ile Ala Arg Pro Gly Ala Pro  
 1060 1065 1070  
 His Leu Leu Leu Val Ser Arg Ser Gly Pro Asp Ala Asp Gly Ala Gly  
 1075 1080 1085  
 Glu Leu Val Ala Glu Leu Glu Ala Leu Gly Ala Arg Thr Thr Val Ala  
 1090 1095 1100  
 Ala Cys Asp Val Ile Asp Arg Glu Ser Val Arg Glu Leu Leu Gly Gly  
 1105 1110 1115 1120  
 Ile Gly Asp Asp Val Pro Leu Ser Ala Val Phe His Ala Ala Ala Thr  
 1125 1130 1135  
 Leu Asp Asp Gly Thr Val Asp Thr Leu Thr Gly Glu Arg Ile Glu Arg  
 1140 1145 1150  
 Ala Ser Arg Ala Lys Val Leu Gly Ala Arg Asn Leu His Glu Leu Thr  
 1155 1160 1165  
 Arg Glu Leu Asp Leu Thr Ala His Val Leu Phe Ser Ser Phe Ala Ser  
 1170 1175 1180  
 Ala Phe Gly Ala Pro Gly Leu Gly Gly Tyr Ala Pro Gly Asn Ala Tyr  
 1185 1190 1195 1200  
 Leu Asp Gly Leu Ala Gln Gln Arg Arg Ser Asp Gly Leu Pro Ala Thr  
 1205 1210 1215  
 Ala Val Ala Trp Gly Thr Trp Ala Gly Ser Gly Met Ala Glu Gly Ala  
 1220 1225 1230  
 Val Ala Asp Arg Phe Arg Arg His Gly Val Ile Glu Met Pro Pro Glu  
 1235 1240 1245  
 Thr Ala Cys Arg Ala Leu Gln Asn Ala Leu Asp Arg Ala Glu Val Cys  
 1250 1255 1260  
 Pro Ile Val Ile Asp Val Arg Trp Asp Arg Phe Leu Leu Ala Tyr Thr  
 1265 1270 1275 1280  
 Ala Gln Arg Pro Thr Arg Leu Phe Asp Glu Ile Asp Asp Ala Arg Arg  
 1285 1290 1295  
 Ala Ala Pro Gln Ala Pro Ala Glu Pro Arg Val Gly Ala Leu Ala Ser  
 1300 1305 1310  
 Leu Pro Ala Pro Glu Arg Glu Glu Ala Leu Phe Glu Leu Val Arg Ser  
 1315 1320 1325  
 His Ala Ala Ala Val Leu Gly His Ala Ser Ala Glu Arg Val Pro Ala  
 1330 1335 1340  
 Asp Gln Ala Ala Glu Val Leu Ser Leu Glu Asn Arg Leu Gly Ala Ala  
 1345 1350 1355 1360  
 Thr Val Arg Leu Pro Thr Thr Thr Val Phe Asp Asp Val Arg Thr Leu  
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 Ala His Leu Ala Ala Glu Leu Gly Gly Ala Thr Gly Ala Glu Gln Ala  
 1380 1385 1390

Ala Pro Ala Thr Thr  
1395

<210> 37  
<211> 1114  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Alignment of the EryA SU

<400> 37  
Ala Pro Val Asp Glu Ile Ile Gly Met Ala Leu Glu Val Asp Ser Glu  
1 5 10 15  
Arg Leu Glu Leu Ile Thr Ser Gly Arg Asp Ser Ala Ala Glu Val Asp  
20 25 30  
Val Pro Asp Glu Leu Met Ala Ser Asp Ala Ala Gly Thr Arg Ala His  
35 40 45  
Asn Phe Met Ala Gly Gly Asp Ala Ala Ile Ser Leu Met Gln Ala Thr  
50 55 60  
Thr Ala Leu Ser Ile Pro Glu Thr Arg Gly Ser Asp Val Met Ser His  
65 70 75 80  
Gln Gly Ala Thr Gly Arg Pro Arg Pro Glu Asp Gly Val Asp Leu Leu  
85 90 95  
Thr Asn Thr Ala Ser Ala Ile Ala Val Leu Leu Ala Leu Thr Ser Val  
100 105 110  
Ala Leu Thr Cys Gly Ser Asp Gly Asp Gln Gly Leu Val Ala Val Ser  
115 120 125  
Ala Gly Glu Val Phe Thr Glu Ser Arg Gln Gly Ala Ser Pro Cys Pro  
130 135 140  
Ser Asp Glu Asp Gly Leu Gly Ser Ala Phe Val Val Gln Arg Asp Arg  
145 150 155 160  
Glu Arg Arg Gly Val Val Ala Ser Val Gln Ser Ser Val Ala Gln Arg  
165 170 175  
Arg Trp Ala Arg Ala Ile Thr Gly Ala Val Ala Val Arg Val Ala Ser  
180 185 190  
Leu Ala Thr Lys Ser Gly Ser Ser Gly Val Leu Leu Ser Ile Ala Val  
195 200 205  
Ala Ile Val Ile Gly Leu Glu Arg Val Val Pro Met Cys Arg Gly Arg  
210 215 220  
Ser Gly Leu Ile Asp Ser Ser Glu Ile Glu Leu Ala Asp Gly Val Arg  
225 230 235 240  
Glu Ser Pro Ala Ala Asp Gly Val Gly Ala Val Val Ile Ala Pro Glu  
245 250 255  
Pro Glu Pro Val Pro Gln Pro Arg Arg Met Leu Pro Ala Thr Gly Val  
260 265 270  
Val Val Val Leu Ala Arg Thr Gly Ala Ala Leu Arg Gly Arg Leu Ala  
275 280 285  
Asp His Leu Ala Ala His Pro Gly Ile Ala Pro Ala Asp Val Ser Trp  
290 295 300  
Thr Met Arg Ala Gln His Phe Glu Glu Ala Val Leu Ala Ala Asp Thr  
305 310 315 320  
Ala Glu Ala Val His Arg Arg Ala Val Asp Ala Val Val Pro Gly Val  
325 330 335  
Val Thr Gly Ser Ala Ser Asp Gly Gly Ser Val Phe Val Ala Glu Ala  
340 345 350  
Arg Glu Pro Val Pro Glu Ser Ile Ala Glu Asp Ala Val Leu Ser Glu  
355 360 365  
Val Ala Gly Arg Ser Val Ser Glu Val Leu Glu Pro Arg Pro Asp Ala  
370 375 380  
Pro Ser Leu Glu Asp Val Val Leu Ala Val Met Val Arg Leu Arg Ala

385					390					395				400
Cys	Ala	Val	Ser	Ile	Gln	Ile	Val	Ala	Ala	Leu	Ser	Leu	Glu	Asp
				405					410					415
Met	Arg	Val	Val	Ala	Arg	Arg	Ser	Arg	Ala	Val	Arg	Ala	Val	Ala
			420					425					430	
Arg	Gly	Ser	Leu	Ser	Val	Arg	Gly	Gly	Arg	Ser	Asp	Val	Glu	Lys
		435					440					445		
Leu	Ala	Asp	Asp	Ser	Trp	Thr	Gly	Arg	Leu	Glu	Val	Ala	Gly	Asp
	450					455					460			
Val	Val	Val	Ala	Asp	Ala	Gln	Ala	Ala	Arg	Glu	Phe	Leu	Glu	Tyr
465				470						475				480
Glu	Gly	Val	Gly	Ile	Arg	Ala	Arg	Ala	Ile	Pro	Asp	Tyr	Ser	Thr
			485						490					495
His	Val	Glu	Pro	Val	Arg	Asp	Glu	Leu	Val	Gln	Ala	Leu	Ala	Gly
			500					505					510	
Thr	Pro	Arg	Arg	Ala	Glu	Val	Pro	Phe	Phe	Thr	Leu	Thr	Gly	Asp
		515					520					525		
Leu	Asp	Gly	Thr	Glu	Leu	Asp	Ala	Gly	Tyr	Arg	Asn	Ile	His	Pro
	530					535					540			
His	Ser	Val	Gln	Ala	Leu	Thr	Asp	Gln	Tyr	Ala	Thr	Ile	Val	Pro
545					550					555				560
Leu	Ala	Ser	Ser	Val	Gln	Glu	Thr	Leu	Asp	Asp	Ala	Glu	Ser	Asp
			565						570					575
Ala	Val	Leu	Gly	Thr	Glu	Asp	Ala	Gly	Asp	Ala	Asp	Arg	Phe	Leu
			580					585					590	
Ala	Leu	Ala	Asp	His	Thr	Arg	Ala	Val	Asp	Trp	Glu	Ala	Val	Leu
	595						600				605			
Arg	Ala	Gly	Leu	Val	Asp	Gly	Gln	Gly	Lys	Phe	Leu	Leu	Pro	Asp
	610					615					620			
Thr	Thr	Pro	Arg	Glu	Leu	Asp	Gly	Trp	Phe	Arg	Val	Asp	Thr	Glu
625					630					635				640
Pro	Arg	Ser	Glu	Pro	Ala	Ala	Leu	Arg	Gly	Arg	Trp	Val	Val	Val
			645						650					655
Glu	Gly	His	Glu	Glu	Asp	Gly	Trp	Thr	Val	Glu	Val	Arg	Ser	Ala
			660				665						670	
Ala	Glu	Ala	Ala	Glu	Pro	Glu	Val	Thr	Arg	Gly	Val	Gly	Gly	Leu
	675						680					685		
Gly	Asp	Cys	Ala	Gly	Val	Leu	Leu	Ala	Leu	Glu	Gly	Asp	Gly	Ala
	690					695				700				
Gln	Thr	Leu	Val	Val	Arg	Glu	Leu	Asp	Ala	Glu	Gly	Ile	Asp	Ala
705					710					715				720
Leu	Trp	Thr	Val	Phe	Gly	Asp	Ala	Gly	Ser	Pro	Val	Ala	Arg	Pro
			725						730					735
Gln	Ala	Lys	Leu	Trp	Leu	Gly	Gln	Val	Ala	Ser	Leu	Arg	Gly	Pro
			740				745						750	
Trp	Thr	Gly	Leu	Val	Leu	Pro	His	Met	Pro	Asp	Pro	Glu	Leu	Arg
	755						760					765		
Arg	Leu	Thr	Val	Leu	Ala	Gly	Ser	Glu	Asp	Gln	Val	Val	Ala	Asp
	770					775					780			
Val	Arg	Ala	Arg	Leu	Ser	Pro	Ala	His	Val	Thr	Ala	Thr	Ser	Glu
785					790					795				800
Ala	Val	Gly	Ile	Val	Gly	Thr	Ala	Gly	Leu	Ala	Glu	Val	Ala	Trp
			805						810					815
Gly	Arg	Ala	Glu	His	Ala	Val	Ser	Arg	Arg	Gly	Pro	Asp	Thr	Glu
		820						825				830		
Val	Gly	Asp	Thr	Ala	Glu	Leu	Thr	Asp	Leu	Ala	Arg	Val	Ser	Val
	835						840					845		
Cys	Val	Ser	Ser	Arg	Glu	Pro	Val	Arg	Glu	Ile	Val	His	Gly	Leu
	850					855					860			
Glu	Gln	Gly	Asp	Val	Val	Arg	Gly	Val	Val	Ala	Ala	Gly	Leu	Pro
865				870						875				880
Gln	Val	Ala	Ile	Asn	Asp	Met	Asp	Glu	Ala	Ala	Phe	Asp	Glu	Val



Ala	Arg	Arg	Gln	Leu	Glu	Ser	Cys	Leu	Glu	Pro	Gly	Val	Asp	Ala	Ala	
			180					185					190			
Ile	Ala	Asn	Leu	Asp	Thr	Arg	Asp	Asp	Ala	Asp	Arg	Leu	Trp	Leu	Ser	
		195					200					205				
Ile	Thr	Val	Thr	Leu	Val	Val	Ala	Leu	Arg	Asn	Glu	Leu	Ala	Thr	His	
	210					215					220					
Val	Glu	Pro	Thr	Pro	His	Val	Asp	Ser	Ser	Gly	Val	Ala	Leu	Leu	Ala	
225					230					235					240	
Gly	Asn	Gln	Pro	Arg	Arg	Gly	Glu	Arg	Thr	Arg	Ala	Ile	Val	Val	Glu	
				245					250					255		
Ala	Glu	Arg	Glu	His	Arg	Glu	Thr	Thr	Ala	His	Asp	Gly	Arg	Pro	Val	
			260					265					270			
Leu	Val	Val	Ala	Arg	Thr	Thr	Ala	Ala	Leu	Arg	Ala	Gln	Ile	Ala	Glu	
	275						280					285				
Leu	Leu	Glu	Arg	Pro	Asp	Ala	Asp	Leu	Ala	Gly	Val	Gly	Leu	Gly	Leu	
	290					295					300					
Thr	Thr	Ala	Arg	His	Glu	His	Ala	Val	Val	Ala	Ser	Thr	Arg	Glu	Glu	
305					310					315					320	
Ala	Val	Arg	Gly	Arg	Glu	Ile	Ala	Ala	Ala	Thr	Ala	Asp	Ala	Val	Val	
				325					330					335		
Glu	Gly	Val	Thr	Glu	Val	Asp	Gly	Arg	Asn	Val	Val	Phe	Leu	Ser	Ala	
			340				345						350			
Gly	Ala	Glu	Ser	Ser	Ser	Pro	Gly	Lys	Ile	Arg	Ala	Asp	Glu	Ser	Met	
	355						360					365				
Ala	Pro	Met	Gln	Asp	Trp	Lys	Val	Ser	Asp	Val	Leu	Arg	Gln	Ala	Pro	
	370					375					380					
Gly	Ala	Pro	Gly	Leu	Asp	Val	Val	Leu	Val	Met	Val	Glu	Leu	Arg		
385					390				395					400		
Ser	Tyr	Val	Glu	Ala	Val	Gln	Ile	His	Ala	Ala	Leu	Thr	Leu	Glu	Asp	
				405					410					415		
Ala	Ala	Lys	Ile	Val	Val	Gly	Arg	Ser	Arg	Ile	Met	Arg	Ser	Leu	Ser	
			420				425						430			
Gly	Glu	Gly	Gly	Ala	Ala	Val	Ala	Leu	Gly	Glu	Ala	Ala	Val	Arg	Glu	
	435						440					445				
Arg	Leu	Arg	Pro	Trp	Gln	Asp	Arg	Leu	Ser	Val	Ala	Gly	Arg	Ser	Val	
	450					455					460					
Val	Val	Ser	Glu	Pro	Gly	Ala	Leu	Arg	Ala	Phe	Ser	Glu	Asp	Cys	Ala	
465					470				475					480		
Ala	Glu	Gly	Ile	Arg	Val	Arg	Asp	Ile	Asp	Asp	Tyr	Ser	Ser	Pro	Gln	
				485					490					495		
Ile	Glu	Arg	Val	Arg	Glu	Glu	Leu	Leu	Glu	Thr	Thr	Gly	Asp	Ile	Ala	
			500					505					510			
Pro	Arg	Pro	Ala	Arg	Val	Pro	Phe	His	Thr	Val	Glu	Ser	Arg	Ser	Met	
	515						520						525			
Asp	Gly	Thr	Glu	Leu	Asp	Ala	Arg	Tyr	Arg	Asn	Ile	Glu	Thr	Arg	Ala	
	530					535					540					
Asp	Val	Thr	Arg	Leu	Ala	Glu	Ser	Tyr	Asp	Ala	Ile	Val	Pro	Val	Val	
545					550					555				560		
Val	Gln	Ala	Val	Glu	Gln	Val	Glu	Glu	Ala	Asp	Gly	Ala	Glu	Asp		
				565				570					575			
Ala	Val	Val	Val	Gly	Ser	His	Asp	Gly	Gly	Asp	Leu	Ser	Ala	Phe	Leu	
			580					585					590			
Arg	Ser	Met	Ala	Thr	His	Val	Ser	Asp	Ile	Arg	Trp	Asp	Val	Ala	Leu	
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Pro	Gly	Ala	Ala	Pro	Phe	Ala	Thr	Gln	Arg	Lys	Tyr	Leu	Gln	Pro	Ala	
	610					615					620					
Ala	Pro	Ala	Ala	Ala	Ser	Glu	Leu	Ala	Arg	Val	Ser	Thr	Pro	Ile	Glu	
625					630					635				640		
Lys	Pro	Glu	Ser	Gly	Asn	Leu	Asp	Gly	Asp	Trp	Val	Val	Thr	Pro	Leu	
				645				650						655		
Ile	Ser	Pro	Glu	Trp	Thr	Glu	Met	Leu	Cys	Glu	Ala	Ile	Asn	Ala	Asn	
			660					665					670			



Gly	Arg	Ala	Leu	Arg	Cys	Glu	Val	Asp	Thr	Ser	Ala	Ser	Arg	Thr	Glu
		675					680					685			
Met	Ala	Gln	Ala	Val	Ala	Gln	Ala	Gly	Thr	Gly	Phe	Arg	Gly	Leu	Leu
		690				695					700				
Leu	Ser	Ser	Asp	Glu	Ser	Ala	Cys	Arg	Pro	Gly	Val	Pro	Ala	Gly	Ala
705						710					715				720
Val	Gly	Leu	Leu	Thr	Val	Gln	Ala	Leu	Gly	Asp	Ala	Gly	Val	Asp	Ala
				725						730					735
Pro	Val	Trp	Cys	Leu	Gln	Gly	Arg	Thr	Pro	Ala	Asp	Asp	Asp	Leu	Ala
			740					745					750		
Arg	Pro	Ala	Gln	Thr	Thr	Ala	His	Phe	Ala	Gln	Val	Ala	Gly	Leu	Leu
		755					760					765			
Pro	Gly	Arg	Trp	Gly	Gly	Val	Val	Leu	Pro	Glu	Ser	Val	Asp	Asp	Ala
	770					775					780				
Ala	Leu	Arg	Leu	Leu	Val	Val	Leu	Arg	Gly	Gly	Gly	Arg	Ala	Glu	Asp
785					790					795					800
His	Leu	Val	Asp	Gly	Arg	Leu	His	Gly	Arg	Val	Val	Arg	Ala	Ser	Leu
			805						810					815	
Pro	Gln	Ser	Gly	Ser	Arg	Ser	Trp	Thr	His	Val	Val	Ala	Ala	Ser	Pro
			820					825					830		
Val	Asp	Gln	Ile	Val	Trp	Ala	Asp	Arg	Ala	Glu	Arg	Val	Ala	Gly	Ala
		835					840					845			
Cys	Pro	Gly	Asp	Asp	Leu	Ala	Ala	Val	Glu	Glu	Ala	Ala	Ser	Ala	Val
	850					855					860				
Val	Cys	Gln	Ala	Ala	Ala	Leu	Arg	Glu	Ala	Leu	Gly	Asp	Glu	Pro	Val
865					870					875					880
Thr	Ala	Leu	Val	Ala	Gly	Thr	Leu	Thr	Asn	Phe	Gly	Ser	Ile	Ser	Glu
				885					890					895	
Val	Ala	Pro	Glu	Glu	Phe	Ala	Glu	Thr	Ile	Ala	Ala	Thr	Ala	Leu	Leu
		900						905					910		
Ala	Val	Asp	Val	Leu	Gly	Asp	Arg	Ala	Val	Glu	Arg	His	Val	Tyr	Cys
		915					920					925			
Val	Gly	Ile	Trp	Gly	Gly	Ala	Gly	Met	Ala	Ala	Ala	Ala	Gly	Ser	Ala
	930					935					940				
Tyr	Asp	Ala	Leu	Glu	His	His	Ala	Arg	Arg	Ser	Cys	Thr	Ser	Val	Ala
945					950					955					960
Thr	Pro	Leu	Pro	Gly	Gly	Ala	Val	Asp	Asp	Gly	Tyr	Leu	Arg	Glu	Arg
			965						970					975	
Leu	Arg	Ser	Leu	Ser	Ala	Asp	Arg	Met	Arg	Thr	Trp	Glu	Arg	Val	Ala
		980						985					990		
Ala	Gly	Pro	Val	Ser	Val	Ala	Val	Ala	Asp	Val	Asp	Trp	Pro	Val	Leu
		995						1000				1005			
Ser	Glu	Gly	Phe	Ala	Thr	Arg	Pro	Thr	Ala	Leu	Phe	Ala	Glu	Leu	Ala
	1010					1015					1020				
Gly	Arg	Gly	Gly	Gln	Ala	Glu	Ala	Glu	Pro	Asp	Ser	Gly	Pro	Thr	Gly
1025					1030					1035					1040
Glu	Pro	Ala	Gln	Arg	Leu	Gly	Leu	Ser	Pro	Asp	Glu	Gln	Gln	Glu	Asn
				1045					1050					1055	
Leu	Glu	Leu	Val	Ala	Asn	Ala	Val	Glu	Val	Leu	His	Glu	Ser	Ala	Ala
		1060						1065					1070		
Glu	Ile	Asn	Val	Arg	Arg	Ala	Ser	Glu	Leu	Leu	Asn	Met	Ala	Lys	Arg
	1075						1080					1085			
Leu	Ser	Ala	Ser	Thr	Leu	Arg	Leu	Pro	Ala	Ser	Leu	Val	Phe	Asp	Thr
	1090					1095					1100				
Val	Thr	Ala	Leu	Gln	His	Leu	Arg	Ala	Arg	Val	Gly	Asp	Ala	Asp	Gln
1105					1110					1115					1120
Ala	Ala	Val	Arg	Val	Val	Gly	Ala								
					1125										

<210> 39  
<211> 1224

<212> PRT  
 <213> Artificial Sequence

<220>

<223> Alignment of the EryA SU

<400> 39

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Gln	Leu	Arg	Val	Leu	Ala	Glu	Gly	Ala	Asn	Leu	Thr	Thr	Gly	Phe	Ala	20	25	30	
Asp	Ile	Gly	Arg	Leu	Tyr	His	Pro	Asp	Pro	Asp	Asn	Pro	Gly	Thr	Ser	35	40	45	
Tyr	Val	Asp	Lys	Gly	Pro	Leu	Thr	Asp	Ala	Asp	Pro	Gly	Ile	Thr	Leu	50	55	60	
Met	Leu	Met	Thr	Ala	Ala	Val	Arg	Ile	Asp	Asp	Ala	Arg	Gly	Thr	Asp	65	70	75	80
Val	Met	Asn	Gly	Gln	Ser	Met	Gln	Leu	Leu	Ala	Gly	Glu	Ala	Glu	Arg	85	90	95	
Val	Asp	Gln	Gly	Ile	Asn	Ser	Ala	Ser	Leu	Ile	Ala	Thr	Phe	Trp	Ala	100	105	110	
Leu	Thr	Ser	Val	Gly	Ile	Ile	Met	Gln	Ala	Arg	Gly	Glu	Cys	Ser	Leu	115	120	125	
Leu	Ala	Val	Thr	Ser	Asp	Tyr	Thr	Phe	Val	Asp	Ser	Thr	Gln	Arg	Gly	130	135	140	
Ala	Ser	Cys	Ala	Ser	Ala	Arg	Asp	Ala	Leu	Ser	Val	Ala	Ala	Leu	Val	145	150	155	160
Glu	Pro	Arg	Ala	Asn	His	Gln	Ala	Val	Leu	Arg	Ser	Val	Gln	Ala	Asn	165	170	175	
Pro	Ser	Glu	Arg	Gln	Leu	Ala	Ala	Ser	Val	Pro	Ala	Ala	Val	Asp	Val	180	185	190	
Glu	Ile	Ala	Gly	Ile	Ala	Thr	Gln	Asp	Asp	Arg	Leu	Arg	Leu	Thr	Ile	195	200	205	
Thr	Ala	Ala	Ile	Val	Val	Ala	Met	Arg	His	Met	Leu	Arg	Ser	His	Ala	210	215	220	
Asp	Leu	Ser	Pro	His	Ile	Asp	Glu	Ser	Ala	Val	Glu	Val	Ile	Arg	Glu	225	230	235	240
Glu	Val	Pro	Pro	Ala	Gly	Glu	Arg	Pro	Gly	Ser	Val	Val	Val	Glu	Ala	245	250	255	
Ala	Glu	Gln	Glu	Ala	Ala	Arg	Thr	Glu	Arg	Gly	Pro	Leu	Phe	Val	Leu	260	265	270	
Gly	Arg	Ser	Glu	Ala	Val	Val	Ala	Arg	Ala	Leu	Ala	Glu	His	Leu	Arg	275	280	285	
Asp	Thr	Pro	Glu	Leu	Gly	Leu	Thr	Asp	Ala	Ala	Trp	Thr	Leu	Thr	Gly	290	295	300	
Ala	Arg	Phe	Asp	Val	Ala	Val	Gly	Asp	Asp	Arg	Ala	Gly	Val	Cys	Ala	305	310	315	320
Glu	Asp	Ala	Leu	Glu	Arg	Pro	Ser	Ala	Asp	Ala	Val	Ala	Pro	Val	Thr	325	330	335	
Ser	Ala	Pro	Arg	Lys	Pro	Val	Leu	Val	Ala	Val	Ala	Arg	Asp	Glu	Ser	340	345	350	
Ser	Glu	Glu	Ser	Met	Ser	Arg	Ala	Glu	Ala	Leu	Ser	Pro	His	Thr	Asp	355	360	365	
Trp	Lys	Leu	Leu	Asp	Val	Val	Arg	Gly	Asp	Gly	Gly	Pro	Asp	Pro	His	370	375	380	
Glu	Asp	Ile	Val	Leu	Ser	Ile	Met	Val	Glu	Leu	Arg	Ala	His	Val	Thr	385	390	395	400
Ala	Val	Gln	Ile	His	Ala	Ala	Leu	Ser	Leu	Glu	Ala	Ala	Ala	Lys	Val	405	410	415	
Val	Ala	Leu	Arg	Ser	Gln	Val	Leu	Arg	Glu	Leu	Asp	Asp	Gln	Gly	Gly	420	425	430	
Val	Ser	Val	Gly	Ala	Ser	Arg	Asp	Glu	Leu	Glu	Thr	Val	Leu	Ala	Arg				

		435					440					445				
Trp	Asp	Gly	Arg	Val	Ala	Val	Ala	Gly	Gly	Thr	Ser	Val	Val	Ala	Pro	
	450					455					460					
Thr	Ala	Glu	Leu	Asp	Glu	Phe	Phe	Ala	Glu	Ala	Glu	Ala	Arg	Glu	Met	
465					470					475					480	
Lys	Pro	Arg	Arg	Ile	Ala	Arg	Tyr	Ser	Ser	Pro	Glu	Val	Ala	Arg	Ile	
				485					490					495		
Glu	Asp	Arg	Ile	Ala	Ala	Glu	Leu	Gly	Thr	Ile	Thr	Ala	Val	Arg	Gly	
			500					505					510			
Ser	Val	Pro	Leu	His	Thr	Val	Thr	Gly	Glu	Val	Ile	Asp	Thr	Ser	Ala	
		515				520						525				
Met	Asp	Ala	Ser	Tyr	Arg	Asn	Ile	Arg	Pro	Leu	Glu	Gln	Val	Arg	Gly	
	530					535					540					
Leu	Val	Glu	Gln	Phe	Asp	Thr	Val	Val	Pro	Val	Leu	Leu	Met	Ala	Val	
545					550					555					560	
Glu	Glu	Thr	Ala	Glu	His	Ala	Gly	Ala	Glu	Val	Thr	Cys	Val	Pro	Thr	
				565					570					575		
Arg	Glu	Gln	Ser	Gly	Pro	His	Glu	Phe	Leu	Arg	Asn	Leu	Leu	Arg	His	
			580					585					590			
Val	His	Gly	Ala	Asp	Leu	Arg	Pro	Ala	Val	Ala	Gly	Gly	Arg	Pro	Ala	
		595					600					605				
Glu	Thr	Glu	His	Gln	Phe	Pro	Arg	Pro	His	Arg	Pro	Ala	Asp	Val	Ser	
	610					615					620					
Ala	Leu	Tyr	Gly	Leu	Ala	Glu	Gln	Gly	Glu	Tyr	Gly	Pro	Ser	Phe	Gln	
625					630					635					640	
Ala	Leu	Arg	Ala	Ala	Arg	Lys	Asp	Asp	Ser	Val	Tyr	Ala	Glu	Val	Ser	
				645					650					655		
Ile	Ala	Ala	Asp	Glu	Glu	Gly	Tyr	Ala	Phe	His	Pro	Val	Leu	Asp	Ala	
			660					665					670			
Val	Ala	Gln	Thr	Leu	Ser	Leu	Gly	Ala	Leu	Gly	Glu	Pro	Gly	Gly	Gly	
		675					680					685				
Lys	Leu	Pro	Phe	Ala	Trp	Asn	Thr	Val	Thr	Leu	His	Ala	Ser	Ala	Thr	
	690					695					700					
Ser	Val	Arg	Val	Val	Ala	Thr	Pro	Ala	Gly	Ala	Asp	Ala	Met	Ala	Leu	
705					710						715				720	
Arg	Val	Thr	Asp	Pro	Ala	Gly	His	Leu	Val	Ala	Thr	Asp	Leu	Val	Val	
				725					730					735		
Arg	Ser	Thr	Gly	Glu	Lys	Trp	Glu	Gln	Pro	Glu	Pro	Arg	Gly	Gly	Glu	
			740					745					750			
Gly	Glu	Leu	His	Ala	Asp	Trp	Gly	Arg	Leu	Ala	Glu	Pro	Gly	Ser	Thr	
		755					760					765				
Gly	Arg	Val	Val	Ala	Ala	Asp	Ala	Ser	Asp	Leu	Asp	Ala	Val	Leu	Arg	
	770					775					780					
Ser	Gly	Glu	Pro	Glu	Pro	Ala	Val	Leu	Val	Arg	Tyr	Glu	Pro	Glu		
785					790											

930	Ala	Glu	Ile	Glu	Asp	Ile	Ala	Ser	Ala	Glu	Ile	Ala	Cys	Thr	Ala	Asp
945	Arg	Asp	Ala	Leu	Ser	Ala	Leu	Leu	Asp	Gly	Leu	Pro	Arg	Pro	Leu	Thr
				965						970						975
	Gly	Val	Val	Ala	Ala	Gly	Val	Leu	Ala	Asp	Gly	Leu	Val	Thr	Ser	Ile
				980					985					990		
	Asp	Glu	Pro	Ala	Val	Glu	Gln	Val	Leu	Arg	Ala	Val	Asp	Ala	Ala	Trp
			995					1000					1005			
	Asn	His	Leu	Thr	Ala	Asn	Thr	Gly	Leu	Ser	Phe	His	Val	Leu	Phe	Ala
	1010					1015						1020				
	Ser	Val	Leu	Ala	Gly	Pro	Gly	Gln	Gly	Val	Ala	Ala	Ala	Asn	Glu	Ser
1025						1030					1035				1040	
	Asn	Ala	Leu	Ala	Leu	Arg	Thr	Arg	Leu	Pro	Ala	Lys	Ala	Leu	Gly	Gly
				1045						1050					1055	
	Leu	Gln	Ala	Ser	Glu	Met	Thr	Ser	Gly	Leu	Gly	Asp	Arg	Ile	Ala	Arg
			1060						1065					1070		
	Thr	Val	Ala	Ala	Leu	Pro	Thr	Glu	Arg	Leu	Ala	Leu	Phe	Asp	Ser	Ala
			1075					1080					1085			
	Arg	Arg	Gly	Gly	Glu	Val	Val	Phe	Pro	Leu	Ser	Ile	Asn	Arg	Ser	Ala
1090						1095						1100				
	Leu	Arg	Arg	Glu	Phe	Val	Pro	Glu	Val	Leu	Arg	Gly	Met	Val	Arg	Ala
1105						1110					1115				1120	
	Lys	Leu	Arg	Ala	Ala	Gly	Gln	Ala	Glu	Ala	Ala	Gly	Pro	Asn	Val	Val
				1125					1130						1135	
	Asp	Arg	Leu	Gly	Arg	Ser	Glu	Ser	Asp	Gln	Val	Ala	Gly	Ala	Glu	Leu
			1140						1145					1150		
	Val	Arg	Ser	His	Ala	Ala	Val	Ser	Tyr	Gly	Ser	Ala	Asp	Gln	Leu	Pro
		1155					1160					1165				
	Glu	Arg	Lys	Ala	Lys	Asp	Phe	Leu	Ala	Val	Glu	Asn	Arg	Leu	Gly	Thr
1170						1175					1180					
	Ala	Thr	Val	Arg	Leu	Pro	Ser	Thr	Leu	Val	Phe	Asp	Thr	Pro	Leu	Ala
1185					1190					1195					1200	
	Val	Glu	His	Leu	Arg	Asp	Arg	Phe	Ala	Ala	Ser	Pro	Ala	Val	Asp	Ile
				1205					1210					1215		
	Gly	Asp	Arg	Leu	Asp	Glu	Leu	Glu								
				1220												

<210> 40  
 <211> 1118  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Alignment of the EryA SU

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	Ser	Phe	Glu	Phe	Val	Ser	Gly	Gly	Gly	Asp	Ala	Ile	Ala	Glu	Ala	Ala
			20					25					30			
	Glu	Pro	Asp	Pro	Asp	Ala	Arg	Leu	Gly	Met	Leu	Ala	Ala	Gly	Asp	Ala
			35					40					45			
	Gly	Ile	Ser	Leu	Met	Ile	Met	Ile	Ser	Ala	Leu	Arg	His	Asp	Val	Ser
50						55					60					
	Arg	Gly	Ser	Ala	Ile	Val	Gly	Thr	Val	Asp	Gly	Pro	Arg	Pro	Asp	Glu
65					70					75					80	
	Ala	Pro	Asp	Glu	Val	Leu	Val	Gly	Thr	Thr	Ala	Ser	Ser	Ala	Val	Ala
				85					90					95		
	Cys	Leu	Leu	Ala	Met	Thr	Gly	Thr	Ala	Leu	Ile	Met	Glu	Ser	Arg	Asp
			100					105						110		

Glu	Cys	Gly	Leu	Ile	Ala	Val	Thr	Ser	Ser	Gly	Ala	Phe	Glu	Arg
	115						120					125		
Ser	Gln	Gly	Gly	Ala	Ala	Cys	Pro	Ser	Lys	Ala	Asp	Gly	Leu	Ala
	130					135					140			
Gly	Val	Leu	Val	Gln	Arg	Ala	Arg	Glu	Arg	Pro	Ala	Val	Leu	Arg
145					150					155				160
Val	Gln	Thr	Ser	Pro	Ala	Gln	Arg	Arg	Leu	Glu	Asn	Ala	Val	Arg
				165					170					175
Gly	Val	Asp	Tyr	Arg	Ile	Val	His	Leu	Ser	Thr	Ala	Glu	Asp	Pro
		180						185					190	Asp
Asp	Leu	Trp	Ile	Ser	Ile	Thr	Val	Ala	Met	Ala	Val	Ala	Leu	Arg
	195						200					205		His
Glu	Met	Arg	Thr	His	Phe	Asp	Pro	Ser	Pro	Gln	Ile	Glu	Asp	Leu
	210					215					220			Ala
Val	Ser	Val	Val	Ser	Gln	Ala	Arg	Ser	Pro	Ala	Gly	Glu	Arg	Pro
225					230					235				240
Ser	Ile	Val	Val	Glu	Ala	Glu	Ala	Asp	Glu	Pro	Glu	Pro	Ala	Pro
				245					250					255
Ser	Gly	Pro	Val	Leu	Val	Leu	Gly	Arg	Asp	Glu	Gln	Ala	Met	Arg
		260						265					270	Gly
Arg	Leu	Ala	Asp	His	Leu	Ala	Arg	Glu	Pro	Arg	Asn	Ser	Leu	Arg
	275						280					285		Asp
Thr	Gly	Phe	Thr	Leu	Thr	Arg	Ser	Ala	Trp	Glu	His	Val	Val	Val
	290					295					300			Gly
Asp	Arg	Asp	Asp	Ala	Leu	Ala	Gly	Arg	Ala	Val	Asp	Arg	Ile	Ala
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Arg	Thr	Ala	Thr	Gly	Gln	Ala	Arg	Thr	Arg	Arg	Gly	Val	Ala	Met
				325					330					335
Ala	Gln	Ala	Arg	Asp	Arg	Glu	Ser	Gln	Asp	Ser	Ile	Arg	Asp	Glu
		340						345					350	Arg
Ala	Leu	Ala	Pro	His	Val	Asp	Trp	Ser	Leu	Thr	Asp	Leu	Leu	Ser
	355						360					365		Gly
Ala	Arg	Pro	Leu	Asp	Asp	Val	Ala	Leu	Ala	Val	Met	Val	Ala	Leu
	370					375					380			Arg
Ser	His	Val	Glu	Ala	Val	Gln	Ile	His	Ala	Ala	Leu	Thr	Leu	Glu
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Ala	Ala	Lys	Leu	Val	Ala	Val	Arg	Ser	Arg	Val	Leu	Ala	Arg	Leu
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Gly	Gln	Gly	Gly	Ala	Ser	Phe	Gly	Leu	Gly	Thr	Glu	Gln	Ala	Ala
		420						425					430	Glu
Arg	Ile	Gly	Arg	Phe	Ala	Gly	Ala	Leu	Ser	Ile	Ser	Gly	Arg	Ser
	435						440					445		Val
Val	Val	Ala	Glu	Ser	Gly	Pro	Leu	Asp	Glu	Leu	Ile	Ala	Glu	Cys
	450					455					460			Glu
Ala	Glu	Gly	Ile	Thr	Ala	Arg	Arg	Ile	Pro	Asp	Tyr	Ser	Ser	Pro
465					470					475				480
Val	Glu	Ser	Ile	Arg	Glu	Glu	Leu	Leu	Thr	Glu	Leu	Ala	Gly	Ile
				485					490					495
Pro	Val	Ser	Ala	Asp	Val	Ala	Leu	Tyr	Thr	Thr	Thr	Gly	Gln	Pro
			500					505					510	Ile
Asp	Thr	Ala	Thr	Met	Asp	Thr	Ala	Tyr	Ala	Asn	Leu	Glu	Gln	Arg
	515						520					525		Gln
Asp	Thr	Arg	Gln	Leu	Ala	Glu	Ala	Phe	Asp	Ala	Val	Val	Pro	Val
	530					535				540				Leu
Thr	Val	Gly	Ile	Glu	Ala	Thr	Leu	Asp	Ser	Ala	Leu	Pro	Ala	Asp
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Gly	Ala	Cys	Val	Val	Gly	Thr	Arg	Asp	Arg	Gly	Gly	Leu	Ala	Asp
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His	Thr	Ala	Leu	Gly	Glu	Tyr	Ala	Gln	Glu	Val	Asp	Trp	Ser	Pro
			580					585					590	Ala
Phe	Ala	Asp	Ala	Arg	Pro	Val	Glu	Val	Gln	Arg	Gln	Tyr	Leu	Pro
	595						600						605	Ile

Pro Thr Gly Gly Arg Ala Arg Glu Asp Asp Asp Trp Arg G Val Val  
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 Arg Glu Ala Glu Trp Glu Ser Ala Ser Leu Ala Gly Arg Val Leu Val  
 625 630 635 640  
 Thr Gly Pro Gly Val Pro Ser Glu Leu Ser Asp Ala Ile Arg Ser Gly  
 645 650 655  
 Leu Glu Gln Ser Ala Thr Val Leu Thr Cys Asp Val Glu Ser Arg Ser  
 660 665 670  
 Thr Ile Gly Thr Ala Leu Glu Ala Ala Asp Thr Asp Ala Leu Ser Thr  
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 Val Leu Leu Ser Arg Asp Gly Glu Ala Val Asp Pro Ser Leu Asp Ala  
 690 695 700  
 Leu Ala Val Gln Ala Leu Gly Ala Ala Gly Val Glu Ala Pro Leu Trp  
 705 710 715 720  
 Val Leu Arg Asn Gln Val Ala Asp Gly Glu Leu Val Asp Pro Ala Gln  
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 Ala Met Val Gly Leu Gly Arg Val Val Gly Ile Gln Pro Gly Arg Trp  
 740 745 750  
 Gly Gly Leu Val Leu Val Asp Ala Asp Ala Ala Ser Ile Arg Ser Leu  
 755 760 765  
 Ala Val Leu Ala Asp Pro Arg Gly Glu Glu Gln Val Ile Ala Asp Gly  
 770 775 780  
 Ile Lys Val Ala Leu Val Pro Ala Pro Ala Arg Ala Ala Arg Thr Arg  
 785 790 795 800  
 Trp Ser Arg Val Val Gly Thr Gly Gly Ile Ala His Val Ala Trp Ala  
 805 810 815  
 Arg Ser Ala Glu His Val Leu Gly Arg Arg Gly Ala Asp Ala Pro Gly  
 820 825 830  
 Ala Ser Glu Arg Glu Glu Leu Thr Ala Leu Thr Gly Val Thr Ile Ala  
 835 840 845  
 Cys Val Ala Asp Arg Ala Arg Leu Glu Ala Val Leu Ala Ala Glu Arg  
 850 855 860  
 Ala Glu Gly Arg Thr Val Ser Ala Val Met Ala Ala Gly Val Ser Thr  
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 Ser Thr Pro Leu Asp Asp Leu Thr Glu Ala Glu Phe Thr Glu Ile Ala  
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 Asp Val Val Arg Gly Thr Val Asn Asp Leu Cys Pro Asp Leu Asp Ala  
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 His Val Leu Phe Asn Gly Val Trp Gly Ser Pro Gly Leu Ala Ser Ala  
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 Ala Ala Asn Ala Phe Asp Gly Phe Arg Arg Arg Ser Glu Ala Pro Val  
 930 935 940  
 Thr Ser Ile Ala Gly Leu Gly Gln Asn Met Ala Gly Asp Glu Gly Gly  
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 Glu Tyr Leu Arg Ser Gln Leu Arg Ala Met Asp Pro Asp Arg Val Glu  
 965 970 975  
 Glu Leu His Ile Thr Asp His Gly Gln Thr Ser Val Ser Val Val Asp  
 980 985 990  
 Met Asp Arg Arg Arg Phe Val Glu Leu Phe Thr Ala Arg His Arg Pro  
 995 1000 1005  
 Leu Phe Asp Glu Ile Ala Gly Ala Arg Ala Glu Ala Arg Gln Ser Glu  
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 Glu Gly Pro Ala Leu Ala Gln Arg Leu Ala Leu Ser Thr Ala Glu Arg  
 1025 1030 1035 1040  
 Arg Glu His Ala His Leu Ile Arg Ala Glu Val Ala Val Leu His Gly  
 1045 1050 1055  
 Asp Asp Ala Ala Ile Asp Arg Asp Arg Ala Arg Asp Phe Met Thr Val  
 1060 1065 1070  
 Asp Asn Arg Leu Ala Ala Val Thr Val Arg Glu Ala Ala Thr Val Val  
 1075 1080 1085  
 Phe Asp Thr Ile Thr Arg Leu Asp His Tyr Leu Glu Arg Val Gly Ala  
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<220>  
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 Glu Leu Glu Phe Ile Val Gly Arg Gly Asp Ala Val Thr Glu Met Thr  
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 Asp Leu Asp Ala Leu Phe Asp Pro Asp Pro Gln Arg His Gly Thr Ser  
 35 40 45  
 Tyr Ser Arg His Ala Phe Leu Asp Gly Ala Asp Ala Ala Ile Ser Leu  
 50 55 60  
 Met Gln Val Thr Thr Leu Phe Asn Ile Asp His Ser Arg Gly Ser Asp  
 65 70 75 80  
 Leu Ala Ala Tyr Gln Gly Gly Gln Asp Ala Val Val Pro Glu Asp Ser  
 85 90 95  
 Glu Leu Leu Thr Asn Ser Ser Ala Val Val Ala Val Leu Leu Ala Val  
 100 105 110  
 Thr Ser Val Ala Leu Ser Cys Gly Ser Asp Gly Asp Cys Gly Leu Val  
 115 120 125  
 Ala Val Ser Ala Gly Glu Val Phe Thr Glu Ser Arg Gln Gly Gly Ala  
 130 135 140  
 Val Cys Ala Ser Ala Glu Asp Gly Phe Ala Val Ala Val Val Leu Gln  
 145 150 155 160  
 Arg Asp Arg Ala Arg Gln Gly Val Val Ala Ser Leu Gln Ala Ser Val  
 165 170 175  
 Ala Gln Arg Lys Trp Ala Arg Ala Ile Thr Gly Ala Val Ala Val Arg  
 180 185 190  
 Val Ala Ser Leu Ala Thr Lys Ser Gly Ser Ser Gly Val Leu Leu Ser  
 195 200 205  
 Ile Ala Val Ala Ile Val Val Gly Leu Asn Arg Leu Val Pro Met Cys  
 210 215 220  
 Arg Gly Arg Ser Pro Leu Ile Glu Ser Ser Gly Val Glu Leu Ala Glu  
 225 230 235 240  
 Ala Val Ser Pro Pro Pro Ala Ala Asp Gly Val Gly Ala Val Val Ile  
 245 250 255  
 Ala Pro Glu Pro Glu Pro Leu Pro Glu Pro Gly Pro Val Gly Val Leu  
 260 265 270  
 Ala Ala Ala Asn Ser Val Val Leu Leu Ala Arg Thr Glu Thr Ala Leu  
 275 280 285  
 Ala Arg Leu Leu Glu Ser Ala Val Asp Asp Ser Val Pro Leu Thr Ala  
 290 295 300  
 Leu Ala Ser Ala Leu Thr Gly Ala His Leu Pro Arg Ala Leu Ile Ala  
 305 310 315 320  
 Gly Asp His Glu Gln Leu Arg Gly Gln Arg Ala Val Glu Val Ala Ala  
 325 330 335  
 Pro Gly Ala Thr Thr Gly Thr Ala Ser Ala Gly Gly Val Val Phe Val  
 340 345 350  
 Ala Glu Ala Arg Gly Ser Val Pro Glu Ser Ile Ala Glu Asp Ala Val  
 355 360 365  
 Leu Ser Glu Val Ala Gly Phe Ser Ala Ser Glu Val Leu Glu Gln Arg  
 370 375 380  
 Pro Asp Ala Pro Ser Leu Glu Asp Val Val Leu Ser Val Met Val Arg

385	Leu	Gly	Ala	Cys	Val	Ser	Ser	Ile	Gln	Ile	Val	Ala	Val	Leu	Ser	Leu
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	Glu	Asp	Gly	Val	Arg	Val	Val	Ala	Leu	Arg	Ala	Lys	Ala	Leu	Arg	Ala
				420					425					430		
	Leu	Ala	Gly	Arg	Gly	Gly	Val	Ser	Leu	Ala	Ala	Pro	Gly	Glu	Arg	Ala
			435					440					445			
	Arg	Ala	Leu	Ile	Ala	Pro	Trp	Glu	Asp	Arg	Ile	Ser	Val	Ala	Ser	Ser
			450				455					460				
	Ser	Val	Val	Val	Ser	Asp	Pro	Glu	Ala	Leu	Ala	Glu	Leu	Val	Ala	Arg
465						470					475					480
	Cys	Glu	Asp	Glu	Gly	Val	Arg	Ala	Lys	Thr	Leu	Pro	Asp	Tyr	Ser	Ser
				485						490					495	
	Arg	His	Val	Glu	Ile	Arg	Glu	Thr	Ile	Leu	Ala	Asp	Leu	Asp	Gly	
			500					505					510			
	Ile	Ser	Ala	Arg	Arg	Ala	Ala	Ile	Pro	Leu	Tyr	Thr	Leu	His	Gly	Glu
			515					520					525			
	Arg	Arg	Asp	Gly	Ala	Asp	Met	Gly	Pro	Arg	Tyr	Asp	Asn	Leu	Ser	Gln
			530				535					540				
	Arg	Asp	Glu	Val	Ser	Ala	Ala	Val	Ala	Asp	His	Ala	Thr	Val	Met	Pro
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	Val	Ile	Thr	Ala	Ala	Val	Gln	Glu	Ile	Ala	Ala	Asp	Ala	Val	Ala	Ile
				565						570					575	
	Gly	Ser	His	Asp	Thr	Ala	Glu	Glu	His	Ile	Ile	Ala	Glu	Leu	Ala	Arg
			580						585				590			
	His	Val	His	Ala	Val	Asp	Trp	Arg	Asx	Val	Phe	Pro	Ala	Ala	Pro	Pro
			595					600					605			
	Val	Ala	Asn	Glu	Pro	Gln	Tyr	Leu	Ala	Pro	Glu	Val	Ser	Gln	Leu	Ala
			610				615					620				
	Asp	Ser	Arg	Arg	Val	Asp	Arg	Pro	Leu	Ala	Thr	Thr	Pro	Val	Asp	Leu
625						630					635					640
	Glu	Gly	Gly	Phe	Val	His	Gly	Ser	Ala	Pro	Glu	Ser	Leu	Thr	Ser	Ala
				645						650					655	
	Val	Glu	Lys	Ala	Gly	Arg	Val	Val	Pro	Val	Ala	Ser	Ala	Asp	Arg	Glu
			660						665					670		
	Ala	Ser	Ala	Ala	Leu	Arg	Glu	Val	Pro	Gly	Glu	Val	Ala	Gly	Leu	Val
			675					680					685			
	His	Thr	Gly	Ala	Ala	Thr	His	Leu	Ala	His	Gln	Ser	Leu	Gly	Glu	Ala
			690				695					700				
	Gly	Val	Arg	Ala	Pro	Leu	Trp	Leu	Val	Ser	Arg	Ala	Leu	Gly	Glu	Ser
705						710					715					720
	Glu	Pro	Val	Asp	Pro	Glu	Gln	Ala	Met	Val	Trp	Leu	Gly	Arg	Val	Met
				725						730					735	
	Gly	Leu	Thr	Pro	Glu	Arg	Trp	Gly	Gly	Leu	Val	Leu	Pro	Ala	Glu	Pro
			740						745					750		
	Ala	Pro	Gly	Asp	Gly	Glu	Ala	Phe	Val	Cys	Leu	Gly	Ala	Asp	Gly	His
			755					760					765			
	Glu	Asp	Gln	Val	Ile	Asp	His	Ala	Arg	Tyr	Gly	Arg	Leu	Val	Arg	Ala
			770				775					780				
	Pro	Leu	Gly	Thr	Arg	Glu	Ser	Ser	Trp	Glu	Ala	Ala	Val	Gly	Thr	Gly
785						790					795					800
	Ala	Leu	Gly	His	Val	Ala	His	Ala	Arg	Cys	Val	Glu	Asp	Val	Val	Ser
				805						810					815	
	Arg	Arg	Gly	Val	Asp	Ala	Pro	Gly	Ala	Ala	Glu	Glu	Ala	Glu	Leu	Val
			820						825					830		
	Ala	Ile	Ala	Lys	Thr	Thr	Ile	Thr	Cys	Val	Ala	Asp	Arg	Glu	Gln	Leu
			835					840					845			
	Ser	Lys	Leu	Leu	Glu	Glu	Leu	Arg	Gly	Gln	Gly	Arg	Pro	Val	Arg	Thr
			850				855					860				
	Val	Val	Thr	Ala	Gly	Val	Pro	Glu	Ser	Arg	Pro	Leu	His	Glu	Ile	Gly
865						870					875					880
	Glu	Leu	Glu	Ser	Val	Cys	Ala	Ala	Val	Thr	Gly	Ala	Arg	Leu	Asp	Leu



				885					890					895					
Cys	Pro	Asp	Ala	Glu	Thr	His	Val	Leu	Phe	Gly	Gly	Val	Trp	Gly	Ser				
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Ala	Asn	Leu	Gly	Ala	Ser	Ala	Ala	Asn	Ala	Tyr	Asp	Ala	Leu	His	Arg				
		915					920					925							
Arg	Ala	Glu	Arg	Ala	Ala	Thr	Ser	Val	Ala	Gly	Ala	Gly	Glu	Gly	Met				
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Ala	Thr	Gly	Asp	Leu	Glu	Gly	Leu	Thr	Arg	Arg	Leu	Arg	Pro	Met	Ala				
945					950				955						960				
Pro	Glu	Arg	Ile	Arg	Ala	Leu	His	Gln	Ala	Asp	Asn	Gly	Asp	Thr	Cys				
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Val	Ser	Ile	Ala	Asp	Val	Asp	Trp	Glu	Ala	Phe	Ala	Val	Gly	Phe	Thr				
		980					985					990							
Ala	Arg	Pro	Arg	Pro	Leu	Leu	Asp	Glu	Leu	Val	Thr	Pro	Ala	Val	Gly				
		995					1000					1005							
Ala	Val	Pro	Ala	Val	Gln	Ala	Pro	Ala	Arg	Glu	Met	Thr	Ser	Gln	Glu				
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Leu	Glu	Phe	Thr	His	Ser	His	Val	Ala	Ile	Leu	His	Ser	Ser	Pro	Asp				
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Ala	Val	Gly	Gln	Asp	Gln	Pro	Thr	Glu	Phe	Leu	Thr	Val	Gly	Asn	Gln				
			1045					1050					1055						
Leu	Gln	Gln	Ala	Thr	Leu	Ala	Leu	Pro	Ala	Thr	Leu	Val	Phe	Glu	Thr				
		1060					1065					1070							
Val	Arg	Arg	Leu	Asp	His	Ile	Gly	Gln	Gln	Asp	Ser	Gly	Thr	Pro	Ala				
		1075				1080						1085							
Arg	Glu	Ala	Ser	Ser	Ala	Leu	Arg	Asp	Gly	Tyr									
		1090				1095													